CLAIMS

What is claimed is:

1. A method comprising:

computing a complex phase difference between a current symbol and a previous symbol;

separating a real value component (R) from a corresponding imaginary value component (I) forming the complex phase difference;

determining at least one boundary constraint line of a complex phase map for a selected demodulation scheme; and

computing an arithmetic combination of the real value component and the corresponding imaginary value component to detect whether a series of bits falls within a selected region of the complex phase map defined by the at least one boundary constraint line.

2. The method of claim 1, wherein the previous symbol is received by a demodulator determining the complex phase difference prior to the current symbol.

3. The method of claim 2, wherein the previous symbol is received immediately prior to the current symbol.

4. The method of claim 1, wherein the at least one boundary constraint line for the complex phase map associated with a Quaternary Phase Shift Keying (QPSK) demodulation scheme includes a first boundary constraint line being equivalent to R+I =0 and a second boundary constraint line being equivalent to R-I = 0.

5. The method of claim 1, wherein the at least one boundary constraint line for the complex phase map associated with a Binary Phase Shift Keying (BPSK) modulation scheme include a boundary constraint line being equivalent to I = 0.

6. The method of claim 1, wherein the detection of the series of bits includes detecting a sign bit of the arithmetic combination being a signed 2's complement combination of an addition of the real value component and the imaginary value component.

7. The method of claim 6, wherein the detection of the series of bits further includes detecting a sign bit of a bitwise inversion of a signed 2's complement combination of a subtraction of the imaginary value component from the real value component.

8. The method of claim 1, wherein the detection of the series of bits includes detecting a sign bit of the real value component of the complex phase difference.

9. The method of claim 1 further comprising performing a channel estimation operation on a carrier propagating a plurality of symbols, including the current symbol and the previous symbol, by counting a number of symbols that fall within an estimated area of the complex phase map, the estimated area being bounded by boundary constraint lines based on a parameterized real value component.

10. The method of claim 9 further comprising:

determining that the carrier is reliable if the number of symbols that fall within the estimated area is greater than a threshold value.

11. A method comprising:

determining a complex phase difference between a current symbol and a complex frequency representation operating as a reference symbol;

separating a real value component (R) from a corresponding imaginary value component (I) forming the complex phase difference;

determining at least one boundary constraint line of a complex phase map for a selected demodulation scheme; and

detecting a first series of bits if an arithmetic combination of the real value component and the corresponding imaginary value component falls within a first selected region of the complex phase map defined by the at least one boundary constraint line.

12. The method of claim 11, wherein the detecting of the first series of bits includes detecting a sign bit of the arithmetic combination being a signed 2's

complement combination of an addition of the real value component and the imaginary value component.

13. The method of claim 12, wherein the detecting of the first series of bits further includes detecting a sign bit of a bitwise inversion of a signed 2's complement combination of a subtraction of the imaginary value component from the real value component.

14. The method of claim 11, wherein the detecting of the first series of bits includes detecting a sign bit of the real value component of the complex phase difference.

15. A demodulator comprising:

a logic unit to separate a real value component (R) from a corresponding imaginary value component (I) forming a complex phase difference between two symbols;

a Quaternary Phase Shift Keying (QPSK) demodulator unit to receive the real value component and the imaginary value component from the logic unit and to detect at least two bit values;

a Binary Phase Shift Keying (BPSK) demodulator unit to receive the real value component from the logic unit and to detect a bit value being equivalent to a sign bit of the real value component;

a first select unit coupled to both the QPSK demodulator unit and the BPSK demodulator unit, the first select unit to select one of the QPSK demodulator unit and the BPSK demodulator unit to perform demodulation;

a second select unit coupled to the first select unit, the QPSK demodulator unit and the BPSK demodulator unit, the second select unit to route either an output of the QPSK demodulator unit or an output of the BPSK demodulator unit based on an output from the first select unit.

16. A method comprising:

separating a real value component (R) from a corresponding imaginary value component (I) forming a complex phase difference between two symbols provided over a carrier;

computing at least one parameterized real value component (aR) by multiplying the real value component (R) with a parameter (a);

for a plurality of symbols, counting a number of symbols that fall within an estimated area of a complex phase map associated with a selected demodulation scheme, the estimated area is bounded by boundary constraint lines based on the parameterized real value component; and

determining that the carrier is reliable if the number of symbols that fall within the estimated area is greater than a threshold value.

17. The method of claim 16 further comprising:

determining that the carrier is unreliable if the number of symbols that fall within the estimated area is less than the threshold value.

18. The method of claim 16, wherein the boundary constraint lines are equivalent to $aR+I = 0$ and $aR-I = 0$.

19. The method of claim 16, wherein the boundary constraint lines are equivalent to (i) $aR+I = 0$, (ii) $aR-I = 0$, (iii) $-R/a - I = 0$, and (iv) $-R/a + I = 0$.

20. A software module stored in a machine readable medium and executed by a processor, comprising:

a first software module to separate a real value component (R) from a corresponding imaginary value component (I) forming a complex phase difference between multiple symbols provided over a carrier;

a second software module to compute at least one parameterized real value component (aR) by multiplying the real value component (R) with a parameter (a);

a third software module to count a number of symbols that fall within an estimated area of a complex phase map associated with a selected demodulation scheme, the estimated area is bounded by boundary constraint lines based on the parameterized real value component; and

a fourth software module to determine that the carrier is reliable if the number of symbols that fall within the estimated area is greater than a threshold value and that the carrier is unreliable if the number of symbols that fall within the estimated area is less than the threshold value.

21. A method comprising:

computing a complex phase difference between multiple symbols;

separating a real value component (R) from a corresponding imaginary value component (I) that collectively form the complex phase difference;

detecting a first series of bits based on an arithmetic combination of the real value component and the corresponding imaginary value component.